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THE CROWN POINT SECTION

by

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SUMMARY OF CONTENTS

INTRODUCTION.. 5–6
HISTORICAL.. 8–11
SECTIONS.. 12–28
SECTION A.. 12–13
SECTION B.. 14–17
SECTION C.. 17–28
CORRELATION AND CONCLUSIONS........................ 29–31
LIST OF SPECIES.. 31–35
DESCRIPTION OF FOSSILS.. 36–40
EXPLANATION OF PLATE 18.. 42
EXPLANATION OF PLATE 19.. 44

INTRODUCTION

Crown Point has long been known as a region of great geological, as well as historical interest. Many writers have spoken of the opportunities there afforded for studying the Ordivician and its characteristic fossils. For this reason, the Cornell Summer School of Field Geology has made it a stopping place on its Champlain trip for the past two years, and, during a stay of several days in the summer of 1901, the following detailed section was made. The collecting from the Chazy and Black River limestones was done by J. Pacheco, C. U. '03, and the writer. The Trenton was worked by C. E. Smith, Graduate, T. Wilson, '02, and C. H. Presho, '03, the first two gentlemen completing the identification for the faunal lists of that part. The maps and plates are the work of Prof. G. D. Harris, to whom many thanks are due for favors in connection with the work and publication.

The peninsula of Crown Point, or Long Point, as it is called locally, juts out into Lake Champlain about five miles north of the village of the same name in Essex County, N. Y. It is approximately a rectangle, two and a half by one mile, bounded on the north and east by the lake and on the west by Bulwagga Bay. The whole point is low and nearly level. The highest part is at the northern end, where the ruins of the old English fort of Crown Point (built 1750) stand. The underlying rock is exposed frequently along the whole shoreline, and ledges often show through the thin coating of Champlain clays which forms the soil. The average dip of these rocks is from six to eight degrees in a northwesterly direction.

The formations represented are first, the Calciferous, which underlies the southern half of the peninsula and is very fossiliferous at an outcrop near the road about a mile south of the ferry landing. *Ecculiomphalus triangulatus* Whitf., *Polytœchia apicalis* Whitf., *Asaphus canalis* Conrad and a small species of *Maclurea* are the common fossils. Overlying it are the lower slaty layers of the Chazy, whose contact is shown on the east shore of Bulwagga Bay about three-fourths of a mile southwest of the fort. North of this nearly the whole point is underlaid by Chazy limestone, which, however, dips under the Black River beds near the northern entrance to the English fort. The Black River is well shown for its entire thickness, 67 feet, and fine opportunities afforded for collecting its numerous fossils in the outcropping ledges and old "marble" quarry between the fort and the rubble dock northwest of it. To the Black River succeeds the Trenton, with a break of only four feet of covered strata between them. Fine collecting may be had along the shore, where 90 feet of the layers are exposed, or in the farm orchard, which is underlaid by the same rock, and where there are many outcrops. Across the lake, on Chimney Point, the top layers of the Chazy, the Black River and the Trenton are shown. The Chazy is cut off on its eastern side by a fault which is seen on Crown Point a few feet east of the lighthouse and whose general direction is about N. 20° E. On the Point the upper layers have been thrown down to the east of the fault line, the throw, judging from the character of the rock and the fossils, probably not exceeding 100 feet.

As a result of glacial action, the limestones in many places are planed off and almost polished. The directions of the striæ vary a few degrees. The limits are S. 34° W. and S. 28° W. for the stronger set. The smoothing and gouging is best shown along the shore to the east of the lighthouse.

HISTORICAL

The first geologist to visit this section appears to have been Prof. Pehr Kalm of the University of Aobo, in Swedish Finland. The account of his travels in North America was published first in Swedish and translated into English by John Reinhold Forster in 1770. Prof. Kalm gives the following description of the geology of the vicinity of Ft. St. Frederick,* where he spent some time in July, 1749:

"The mountains on which Ft. St. Frederick is built consisted generally of a deep black limestone, lying in lamellæ, as slates do, and it might be called a kind of slate which can be turned into quicklime by fire. This limestone is quite black in the inside and when broken appears to be of an exceedingly fine texture. There are some grains of dark spar scattered in it, which, together with some other inequalities, form veins in it. The strata which ly uppermost in the mountains consist of a grey limestone, which is seemingly no more than a variety of the preceding. The black limestone is constantly found filled with petrefactions of all kinds, and chiefly the following: Pectinites, or petrified Ostriæ Pectines.† These petrified shells are more abundant than any others that have been found here, and sometimes whole strata are met with, consisting merely of a quantity of shells of this sort grown together. They are generally small, never exceeding an inch and a half in length. They are found in two different states of petrefaction; one shews always the impressions of the elevated and hollow surfaces of the shells, without any vestige of the shells themselves; in the other appears the real shell sticking in the stone, and by its light color is easily distinguishable from the stone. Both these kinds are plentiful in the stone; however, the impressions are more in number than the real shells. Some of the shells are very elevated, especially in the middle, where they form, as it were, a hump; others, again, are depressed in the middle; but in most of them the outward surface is remarkably elevated. The furrows always run longitudinally, or from the top, diverging to the margin. Petrified Cornua ammonis. These are likewise frequently found, but are not equal to the former in number. Like the pectinitæ, they are found really petrified and in impressions; amongst them were some petrified snails. Some of these Cornua Ammonis were remarkably big, and I do not remember seeing their equals, for they measured above two feet in diameter."

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*Fort St. Frederick is situated a few rods to the northeast of the English fort (see map). It was built by the French in 1730 and held by them for about 20 years.

†*Rafinisquina alternata* answers this description very well.

"Different kinds of corals could be plainly seen in and separated from the stone in which they lay. Some were white and ramose, or Lithopytes;* others were starry corals, or Madrepores.† The latter were rather scarce."

"I must give the name of stone-balls‡ to a kind of stones, foreign to me, which are found in great plenty in some of the rock-stones. They were globular, one-half of them projecting generally above the rock and the other remaining in it. They consist of nearly parallel fibres, which arise from the bottom as from a center and spread over the surface of the ball and have a grey color. The outside of the balls is smooth, but has a number of small pores, which externally appear to be covered with a pale grey crust. They are from an inch to an inch and a half in diameter."

The above is quoted so fully on account of its historic interest, as showing the state of knowledge of paleontology in the middle of the eighteenth century.

Prof. Emmons speaks of the section in his final report of the second district of New York (1842). He considers the rocks at the extreme end of Long Point to be Chazy underlying a thin portion of Trenton, the Birdseye being wanting. In speaking of the black limestone, he says:

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*Probably Prof. Kalm refers to the ramose form of *Monticulipora lycoperdon*.

†Possibly *Columnaria alveolata*.

‡This is a very good description, and the earliest, of the hemispheric form of *Monticulipora lycoperdon*.

"The upper surface of this rock is plated with a layer of chert, one or two inches thick, which is spread very evenly over almost the whole exposure of the rock at this point. This layer is smoothed and polished by drift which has been forced over it. * * * Following the shore along the bay, I found a stratum about one foot thick filled with lingulæ. They were confined wholly to this layer, and thousands of them could have been obtained, though from the thinness of the shell it is difficult to obtain them in a perfect state. That part of the rock which has been employed in the fortification is the Trenton limestone. As in the walls, the shaly part of the stone frequently contains *Trinucleus tesselatus* and *Orthis testudinaria.*"

In a diagramatic section, from the town of Crown Point to the fortress, he gives the following in order from south to north:

Archæn,
Drift,
Potsdam sandstone,
Calciferous sandrock,
Drab-colored layers,
Fault,
Calciferous sandrock,
Chazy,
Birdseye,
Limestone with fucoidal layers.

In the Geology of Vermont (1861), Prof. Edward Hitchcock speaks of the Chazy as being "abundantly exposed" at Crown Point, and as part of an anticlinal which can be traced across the lake to Chimney Point, thence northward through the Vermont towns of Addison, Panton and Ferrisburgh into Charlotte. The following dips and strikes are given:

	Strike.	*Dip.*
Crown Point	N. 48° E.	9° N. W.
Chimney Point	N. E. & S. W.	8° N. W.

He mentions also the occurrence here of the Birdseye and Trenton and the great number of specimens of *Lingula crassa* Hall in the latter.

In 1891 President Ezra Brainerd[*] published a carefully measured section of the Chazy, which is as follows, the strata being given in ascending order:

A	1.	Sandstone and slate interstratified	23 feet
	2.	Impure limestone containing *Orthis platys*	25 feet
B		Beds containing *Maclurea magna*	200 feet
C	1.	Dark gray, massive limestone, weathering in darker stripes an inch wide, containing *Bucania* sp. und	40 feet
	2.	Tough, siliceous and magnesian rock, passing into a two-foot bed of pure sandstone	17 feet
		Aggregate thickness	305 feet

In a later paper[†] Professors Brainerd and Seely reprint this section with a geologic map of Crown Point, Chimney Point and Port Henry. They also mention the occurrence of the higher measures of Calciferous on the east side of the peninsula, the fossils seeming to indicate Group D. The Black River and Trenton were recognized by them as being well shown.

Prof. J. F. Kemp, in his report on the geology of Essex County, N. Y.,[‡] gives a geologic map of Crown Point township, in which he represents the greater portion of the peninsula as underlaid by the Chazy, with the Trenton at the extreme point. He mentions the locality as a good one for studying the older Paleozoics, as all the formations from the Potsdam to the base of the Utica slate are represented.

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[*] Bull. Geol. Soc. Am., vol. 2, p. 300, 1891.

[†] Bull. Am. Mus. Nat. Hist., vol. 8, p. 305, 1896.

[‡] Report of the State Geologist, 1893.

In his paper on the Upper Ordivician faunas of the Champlain Valley* (1899) Theo. G. White gives a short notice of this section. The thickness of the Black River limestone he states as 71 feet, 3 inches, and of the Trenton 100 feet.

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*Bull. Geol. Soc. Am., 1899.

SECTIONS

As a continuous exposure of the rocks could not be had in any one line, three sections were made. The measurements were made with tape, hand level, and by plotting on the map.

SECTION A

Section A begins with the top layers of the Calciferous and runs for about a thousand feet along the east shore of Bulwagga Bay. The strike here is N. 30° E.

In ascending order the measures were:

A 1. Light gray, pure, dolometic limestone in two heavy beds whose surfaces were uneven and worn into humps and depressions. Probably Calciferous. 3 ft. 3 in.

2. Thick beds of slaty shale, with occasional bands of hard, fine-grained, sparkling limestone. The latter layers contain numerous fragments of *Lingula brainerdi* sp. nov. Their surfaces are covered with an undetermined species of fucoid. Pyrite is very abundant. 12 ft. 7 in. 12 ft. 7 in.

3. Heavy bedded, impure gray limestone, weathering to a rough, sandy appearance. No fossils. 5 ft. 0 in. 17 ft. 7 in.

4. Heavy bedded limestones, interstratified with slaty shale. No fossils other than the numerous fucoids. 7 ft. 7 in. 25 ft. 2 in.

5. Two heavy beds of light gray, coarsely crystalline, impure limestone, containing few fossils. 3 ft. 4 in. 28 ft. 6 in.

*r *Camarella varians.*
r *Dinorthis platys.*

6. Thin bedded, impure, nodular; blue limestone. Some layers contain many fossils. 3 ft. 4 in. 31 ft. 10 in.

r *Maclurea magna.*
r *Hebertella borealis.*
c *Dinorthis platys.*
r *Orthis costalis.*
c *Rafinisquina fasciata.*
r *R. champlainensis.*
c *Asaphus canalis.*

7. Thin bedded, impure limestone, interstratified with coarsely crystalline, impure layers containing many crinoid stems. Fossils rare. At base *Dinorthis platys* was common and *Asaphus canalis* rare. At top we found:

r *Maclurea magna.*
r *Camarella varians.*
c *Leperditia canadensis* var. *nana.*
c *Orthis* (?) *porcia.*
r *Asaphus canalis.*

7 ft. 10 in. 39 ft. 8 in.

8. Impure, heavy bedded, bluish limestones containing many fossils, which, however, it is difficult to extract. 12 ft. 3 in. 51 ft. 11 in.

r *Orthis* (?) *porcia.*
c *Rafinisquina champlainensis.*
r *Hebertella borealis.*
r *Dinorthis deflecta* (?).
r *Asaphus canalis.*
rr *Triplecia gracilis.*

From this point the rocks are covered for about a thousand feet along the shore. Then we find impure, bluish limestones in which *Maclurea magna* is very common.

At A 8 the directions of the joint planes are N. 50° E., N. 35° W., and N. & S. Glacial striæ, N. 34° E.

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*The small letter before each name signifies abundance: c means common, a abundant, aa, that the rock is filled with individuals of that species; r denotes rare and rr that only one or two specimens were found.

SECTION B.

Section B begins on the point directly north of the lighthouse and follows the shore westward to the beginning of a sandy beach just beyond the covered entrance of old Fort St. Frederick. All the rock exposed is Chazy limestone.

B 1. One foot of sandy, non-fossiliferous limestone. 1 ft. 1 ft. 0 in.

2. Impure, thin bedded, nodular limestone. No fossils. 8 ft. 3 in. 9 ft. 3 in.

3. Heavy bedded, much jointed, impure, gray limestone. 4 ft. 13 ft. 3 in.

r *Rafinisquina fasciata.*
rr *Ctenodonta levata.*
rr *Raphistoma stamineum.*
r *Asaphus canalis.*
c *Leperditia amygdalina.*
c *Dinorthis deflecta* (?)
r *Maclurea magna.*
rr *Raphistoma planistria* var. *parvum.*
r Crinoid stems.

4. Impure, very fossiliferous, fine-grained, thin bedded limestone with good joints N. 75° E. and N. 20° E. 3 ft. 3 in. 16 ft. 6 in.

c *Bucania champlainensis.*
rr *B. sulcatina.*
rr *Raphistoma stamineum.*
rr *R. striatum.*
c *Rafinisquina champlainensis.*
r *R. alternata.*
rr *R. fasciata.*
a *Dinorthis deflecta* (?)
rr *Camarella varians.*
r *Asaphus canalis.*
rr *Illænus arcturus.*
c *Leperditia amygdalina.*
r *Streptolasma expansum.*

In this zone the operculum of *Maclurea magna* was found rather commonly.

5. Covered by bay and sandy beach to the point on which the ferry lands. 42 ft. 58 ft. 6 in.

6. Light gray, sparkling, fine-grained limestone, much broken and jointed. The principal

joints are N. 78° W., N. 42° E. and N. 47° W. Few fossils. 8 ft. 6 in. 67 ft. 0 in.

r *Maclurea magna.*
c *Asaphus canalis.*
r *Orthoceras* sp. und.
r *Camarella* sp. und.
c *Leperditia canadensis* var. *nana.*

7. Impure, nodular, bluish limestone containing few fossils. 4 ft. 2 in. 71 ft. 2 in.

c *Maclurea magna.*
r *Triplecia gracilis.*
rr *Illænus arcturus.*
rr *Ecculiomphalus fredericus.*

8. Fairly pure, thin bedded, gray layers. 1 ft. 6 in. 72 ft. 8 in.

rr *Rafinisquina robusta.*
c *Dinorthis deflecta* (?).
r *Dalmanella* (?) *plicifera.*
r *Camarella varians.*
r *Maclurea magna.*
c *Leperditia amygdalina.*
c *Leperditia canadensis* var. *nana.*
r *Primita logani.*
r *Asaphus canalis.*

9. Impure, thin bedded, shaly limestones, alternating with thicker, pure layers. 6 ft. 6 in. 79 ft. 2 in.

rr *Ctenodonta levata.*
c *Maclurea magna.*
rr *Raphistoma striatum.*
rr *Illænus ovatus.*
rr *Asaphus canalis.*
rr *Murchisonia* sp. und.
c *Streptolasma expansum.*
c *Dinorthis deflecta* (?)
c *Camarella longirostris.*
c *Bucania champlainensis.*
rr *Leperditia canadensis* var. *nana.*

10. Fine grained, dark gray, thin bedded limestones, sparkling when fractured. Very fossiliferous. It is the best collecting place for brachiopods on the Point. Well exposed about one hundred feet west of the ferry landing. Marked F on the map. 5 ft. 4 in. 84 ft. 6 in.

r *Maclurea magna.*
r *Raphistoma planistria* var. *parvum.*
r *Pleurotomaria* sp. und.
r *Murchisonia perangulata.*
rr *Bucania bidorsata* (?).
r *Rafinisquina alternata.*
rr *R. fasciata.*
c *R. champlainensis.*
a *Dinorthis deflecta* (?).
r *Camarella longirostris.*
r *C. varians.*
r *Asaphus canalis.*
rr *Illænus ovatus.*
rr *Calymene* sp. und.
r *Leperditia canadensis* var. *nana.*
rr *Stictopora elegantula* (?).

11. Thick bedded, rather pure, gray limestone exposed just west of entrance to the old French fort. 4 ft. 2 in. 88 ft. 8 in.

r *Maclurea magna.*
a *Dinorthis deflecta* (?).
c *Asaphus canalis.*
rr *Illænus ovatus.*
r *Leperditia canadensis* var. *nana.*
c *Dalmanella* (?) *plicifera.*
r *Rafinisquina champlainensis.*
r *Camarella varians.*
r *Triplecia gracilis.*

12. Fine grained, gray, sparkling layers in heavy beds. No fossils. 2 ft. 8 in. 91 ft. 4 in.

13. Dark gray, thin bedded, pure limestone which weathers so as to show bands about an inch in width. Bottom foot shaly. Fossils not common. The *Rafinisquinas* found here are a small but strongly marked variety, never exceeding three-eighths of an inch in width. This variety occurs also in C 10, where it is again associated with *Camarella longirostris*, *C. varians* and *Triplecia gracilis*, which are the most common species of the two zones. 5 ft. 96 ft. 4 in.

rr *Ctenodonta nasuta.*
rr *Metoptoma dubia.*
r *Triplecia gracilis.*
a *Camarella longirostris.*
a *C. varians.*
a *Rafinisquina alternata.*
a *Asaphus canalis.*
r *A. obtusus.*
rr *Bathyurellus validus.*

14. Heavy bedded, pure limestone, containing some veins of calcite. Very hard. Bluish gray in color. Forms the top layers of the small cliff in front of Ft. St. Frederick. Except for one cephalon of *Asaphus canalis*, no fossils were found. 7 ft. 6 in. 103 ft. 10 in.

15. Heavy bedded, light colored magnesian limestone which weathers on a vertical surface in ridges about an inch apart. Well shown at the once secret entrance to the old fort. 7 ft. 3 in. 111 ft. 1 in.

rr *Camarella longirostris.*
rr *Dalmanella testudinaria.*
rr *D.* (?) *plicifera.*
r *Triplecia gracilis.*
r *Asaphus platycephalus.*
c *A. canalis.*
c *Asaphus obtusus.*
r *Illænus ovatus.*
c *Leperditia canadensis* var. *nana.*
r *Primita logani.*

16. Lithological character same as 15, but carrying fewer fossils. 5 ft. 116 ft. 1 in.

rr *Rafinisquina alternata.*
c *Asaphus canalis.*
c *Camarella varians.*

17. Covered along a sandy beach to the middle layers of the Black River limestone. The top of No. 16 is 40 ft. below the base of the Black River limestone.

SECTION C

Section C extends from the road at a point about one-half mile south of the light house across the fields through the old English fort, then from the northern entrance of the fort northwest to the shore beyond the old "marble quarry". Thence it follows the shore where there is an almost continuous exposure of the strata around to the northwestern corner of the Point. The middle and upper Chazy, all the Black River, and the lower 90 feet of the Trenton are shown.

C 1. Heavy bedded layers, largely made up of sand grains cemented by lime. Exposed in a ridge running N. E. and S. W. 8 ft. 2 in. 8 ft. 2 in.

r *Maclurea magna.*
rr *Orthis hippolite.*
rr *Rhynchonella* (?) *acutirostris.*
rr *Camarella varians.*
c *Asaphus canalis.*
c *Leperditia canadensis* var. *nana.*
r *Leperditia amygdalina.*

2. Covered across a nearly level field. 82 ft. 90 ft. 2 in.

3. Bottom foot a very hard, dark gray, fine grained, rather pure limestone containing no fossils. Above this, 6 ft. 2 in. of impure, very fossiliferous, shaly limestone. 7 ft. 2 in. 97 ft. 4 in.

c *Maclurea magna.*
rr *Ecculiomphalus fredericus.*
c *Dinorthis deflecta* (?).
r *Rafinisquina champlainensis.*
r *Rafinisquina fasciata.*
rr *Camarella longirostris.*
c *Asaphus canalis.*
r *Leperditia amygdalina.*

4. Thin, impure, evenly bedded layers on west side of a small ridge parallel to C 1. 7 ft. 3 in. 104 ft. 7 in.

c *Maclurea magna.*
rr *Camarella longirostris.*
c *Dinorthis deflecta* (?).
rr *Illænus ovatus.*
rr *Asaphus canalis.*
rr *Leperditia amygdalina.*

5. One layer of hard, fine grained, dark gray limestone with no recognizable fossils beyond *Leperditia canadensis* var. *nana* and a few fragments of a trilobite. The dip on the surface of this layer is 7° 20′ N. 59° W. 2 ft. 3 in. 106 ft. 10 in.

6. Impure, shaly, somewhat nodular and irregularly bedded layers with fucoid markings, forming the top layers of the ridge a few yards southeast of the pavilion. One of the best collecting places for trilobites and gastropods. 5 ft. 3 in. 112 ft. 1 in.

rr *Ctenodonta levata.*
c *Maclurea magna.*
rr *Pleurotomaria* sp. und.
r *Raphistoma striatum.*
rr *Cyrtolites* cf. *trentonensis.*
rr *Murchisonia perangulata.*
rr *Ecculiomphalus fredericus.*
r *Rafinisquina champlainensis.*
r *R. alternata.*
c *Dinorthis deflecta* (?).
c *Asaphus canalis.*
r *Illænus ovatus.*
r *I. arcturus.*
r *Leperditia canadensis* var. *nana.*
c *Monticulipora lycoperdon.*
c *Palaeocistites tenuiradiatus.*
rr *Lituites* sp. und.

7. Hard, fine grained, bluish limestone. 3 ft. 10 in. 115 ft. 11 in.

rr *Ecculiomphalus fredericus.*
c *Maclurea magna.*
c *Raphistoma stamineum.*
r *R. planistria* var. *parvum.*
rr *Camarella varians.*
c *Dinorthis deflecta* (?).
c *Asaphus canalis.*
r *Illænus ovatus.*
r *Streptolasma expansum.*
rr *Orthoceras tenuiseptum.*

8. Covered. 4 ft. 119 ft. 11 in.

9. Hard, heavy bedded, bluish gray, non-fossiliferous limestone lying north of the pavilion. 6 ft. 125 ft. 11 in.

10. Quite impure, shaly, light gray limestone between the pavilion and the edge of the debris piled up east of the English fort. 12 ft. 3 in. 138 ft. 2 in.

rr *Ambonychia mytiloides.*
rr *Metoptoma montrealensis.*
r *M. dubia.*
r *Pleurotomaria* sp. und.
c *Rafinisquina alternata.**
r *Dinorthis deflecta* (?).
r *Dalmanella* (?) *plicifera.*
c *Triplecia gracilis.*
r *Camarella varians.*
c *C. longirostris.*
c *Asaphus canalis.*
r *A. marginalis.*
r *A.* sp.
c *Leperditia canadensis* var. *nana.*

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*See Zone 13, Section B.

11. Covered. 25 ft. 163 ft. 2 in.

12. Layers in bottom of trench at northeastern angle of fort. Pure, thin bedded magnesian limestone. Very fossiliferous. 8 ft. 5 in. 171 ft. 7 in.

c *Maclurea magna.*
rr *Raphistoma stamineum.*
a *R. planistria* var. *parvum.*
r *Murchisonia* sp. und.
r *Pleurotomaria* sp. und.
rr *Metoptoma montrealensis.*
rr *Lituites undatus.*
r *Camarella varians.*
r *C. longirostris.*
r *Triplecia gracilis.*
rr *Dalmanella* (?) *plicifera.*
c *Dinorthis deflecta* (?).
a *Asaphus canalis.*
r *A. marginalis.*
rr *A. obtusus.*
r *Leperditia canadensis* var. *nana.*
c *Palaeocistites tenuiradiatus.*

13. Dark gray, very heavy bedded magnesian limestone weathering in alternating light and dark bands an inch wide. Contains a few specimens of *Maclurea magna.* 17 ft. 3 in. 188 ft. 10 in.

14. Very hard, bluish gray magnesian limestone in heavy beds. No fossils. 7 ft. 2 in. 196 ft.

15. One layer of coarse grained sandstone in which there are many holes, as though fossils had been dissolved out. Forms the floor of the western part of the parade ground inside the fort. 2 ft. 198 ft.

16. Hard magnesian limestone containing many large water worn sand grains. 1 ft. 199 ft.

r *Raphistoma stamineum.*
r *Camarella varians.*
r *Dinorthis deflecta* (?).
c *Asaphus canalis.*

Top of the Chazy.

17. Covered to bottom of ledge just across the road from the north entrance to the fort. 20 ft. 219 ft.

18. Rather thick layers (6–12 inches) of dove colored, pure limestone having a conchoidal fracture. The middle two feet are almost black, but the top and bottom of the zone are of the characteristic color and pureness of the "Birdseye" limestone of the Mohawk Valley. "Birdseyes" are common throughout the five feet. 5 ft. 224 ft.

r *Holopea* sp. und.
r *Murchisonia* sp. und.
r *Zygospira recurvirostris.*
r *Leperditia fabulites.*
c *Phytopsis tubulosus.*

19. Fairly pure, heavy bedded, fine grained, dark gray limestone with conchoidal fracture. 7 ft. 231 ft.

rr *Whitella ventricosa.*
r *Ctenodonta nasuta.*
r *Cuneamya subtruncata.*
c *Ctenodonta levata.*
r *Maclurea logani.*
rr *Murchisonia gracilis.*
c *M. milleri.*
r *Pleurotomaria subconica.*
c *Endoceras* sp. und.
r *Rafinisquina alternata.*
r *Strophomena incurvata.*
c *Plectorthis plicatella.*
r *Asaphus platycephalus.*
r *Ceraurus pleurexanthemus.*
c *Leperditia fabulites.*
c *L. canadensis* var. *nana.*
rr *Primita logani.*
c *Monticulipora lycoperdon.*
c *Streptolasma corniculum.*

20. Impure, light gray, coarse grained, heavy bedded limestone containing many fossils. Top layers of the ledge. In the upper layers of this zone is a very large specimen of *Columnaria alveolata.* 2 ft. 6 in. 233 ft. 6 in.

rr *Ctenodonta nasuta.*
r *Murchisonia milleri*
r *Fusispira subfusiformis.*
r *Endoceras* sp. und.
c *Asaphus platycephalus.*
r *Illænus arcturus.*
r *I. americanus.*

c *Dalmanella subæquata* var. *pervetus.*
r *Plectorthis plicatella.*
r *Rafinisquina alternata.*
r *Rhynchotrema inæquivalve.*
c *Zygospira recurvirostris.*
c *Columnaria alveolata.*
r *Stictopora elegantula.*
r *Bathyurus spiniger.*
r *Leperditia canadensis* var. *nana.*
c *Leperditia fabulites.*
c *Streptolasma corniculum.*
c *Monticulipora lycoperdon.*

21. Impure, dark gray limestone containing much chert. This zone is capped by a two inch layer of chert which has been polished by the action of the ice, glacial striæ showing upon it. This is probably the layer spoken of by Prof. Emmons. (See historical sketch.) 5 ft. 6 in. 239 ft.

c *Strophomena incurvata.*
r *Zygospira recurvirostris.*
r *Asaphus platycephalus.*
r *Leperditia fabulites.*
r *Leperditia canadensis* var. *nana.*
r *Stromatocerium rogosum.*
r *Columnaria alveolata.*

22. Covered. 4 ft. 243 ft.

23. Impure, light gray, coarse grained limestone containing nodules of chert. 6 ft. 8 in. 249 ft. 8 in.

c *Cuneamya subtruncata.*
rr *Murchisonia gracilis.*
rr *M. milleri.*
c *Rafinisquina alternata.*
r *Rhynchotrema inæquivalve.*
c *Strophomena incurvata.*
r *Plectorthis plicatella.*
r *Asaphus platycephalus.*
r *Streptolasma corniculum.*
rr *Illænus arcturus.*
rr *Dalmanites callicephalus.*
rr *D. eboraceus.*
c *Leperditia fabulites.*
c *Stromatocerium rogosum.*
c *Columnaria alveolata.*
r *Monticulipora lycoperdon.*

24. Impure, light colored, coarse grained layers grading into a black, fine grained limestone with conchoidal fracture. Contains some chert. 6 ft. 2 in. 255 ft. 10 in.

r *Murchisonia milleri.*
rr *Raphistoma* sp. und.
c *Endoceras* sp. und.
c *Rafinisquina alternata.*
a *Strophomena incurvata.*
rr *Dalmanella testudinaria.*
a *Zygospira recurvirostris.*
c *Rhynchotrema inæquivalve.*
rr *Dinorthis pectinella.*
c *Plectorthis plicatella.*
c *Stictopora elegantula.*
c *Stromatocerium rogosum.*
a *Monticulipora lycoperdon.*
a *Leperditia fabulites.*
a *L. canadensis* var. *nana.*
c *Asaphus platycephalus.*
a *Dalmanites callicephalus.*
c *D. eboraceus.*
rr *Illænus arcturus.*
r *Bathyurus spiniger.*
c *Ceraurus pleurexanthemus.*
c *Streptolasma corniculum.*

25. Heavy bedded, black, fine grained limestone with conchoidal fracture, passing into a coarser magnesian limestone. Forms the top layers of the old black marble quarry. 6 ft. 7 in. 262 ft. 5 in.

r *Ctenodonta nasuta.*
r *C. levata.*
rr *Raphistoma lenticulare.*
r *Murchisonia milleri.*
c *Asaphus platycephalus.*
c *Strophomena incurvata.*
c *Zygospira recurvirostris.*
r *Stromatocerium rogosum.*

26. Dark, bluish gray, heavy bedded, impure limestone containing few fossils. 6 ft. 9 in. 269 ft. 2 in.

rr *Maclurea* cf. *affinis.*
r *Ctenodonta levata.*
r *Strophomena incurvata.*
r *Illænus americanus.*
c *Monticulipora lycoperdon.*

27. Hard, dark gray, quite pure limestone along the shore west of the rubble dock. 14 ft. 10 in. 284 ft.

rr *Ctenodonta levata.*
r *Maclurea logani.*
r *Glossina trentonensis.*
c *Rafinisquina alternata.*
rr *Strophomena incurvata.*
r *Dinorthis pectinella.*
c *Triplecia extans.*
r *Asaphus platycephalus.*
r *Leperditia canadensis* var. *nana.*
c *Stromatocerium rogosum.*
r *Monticulipora lycoperdon.*
c *Columnaria alveolata.*

28. Very impure, coarse grained, soft, crumbly limestone. 2 ft. 286 ft.

c *Maclurea logani.*
r *Dalmanella testudinaria.*
c *Strophomena incurvata.*
c *Asaphus platycephalus.*

29. Covered along a stony beach. 4 ft. 290 ft.

30. Black, rather pure layers of limestone with shaly partings. Base of the Trenton. 4 ft. 9 in. 294 ft. 9 in.

r *Endoceras protiforme.*
a *Raphistoma lenticulare.*
c *Bellerophon bilobatus.*
r *Subulites elongata.*
rr *Ctenodonta levata.*
r *Triplecia extans.*
rr *Rhynchotrema inæquivalve.*
r *Asaphus platycephalus.*

31. A lighter colored, hard, pure limestone in layers about five inches thick. 6 ft. 3 in. 301 ft.

r *Endoceras protiforme.*
r *Dalmanella testudinaria.*
c *Plectambonites sericeus.*
rr *Parastrophia hemiplicata.*
rr *Calymene senaria.*
r *Ceraurus pleurexanthemus.*

32. Calcareous layers like the preceding but interbedded with much shale. 4 ft. 6 in. 305 ft. 6 in.

r *Bellerophon bilobatus.*
r *Murchisonia milleri.*
r *Whitella ventricosa.*
c *Ctenodonta levata.*
c *Dalmanella testudinaria.*
a *Plectambonites sericeus.*
r *Rafinisquina alternata.*
r *Dinorthis pectinella.*
r *Calymene senaria.*
r *Illænus ovatus.*
r *Monticulipora lycoperdon.*

33. Thick, alternating layers of shale and pure limestone covered for the most part by fragments of the underlying rock. 5 ft. 310 ft. 6 in.

r *Orthoceras* sp. und.
rr *Bucania* sp. und.
aa *Dalmanella testudinaria.*
a *Orthis tricenaria.*
aa *Plectambonites sericeus.*
r *Rafinisquina alternata.*
r *Parastrophia hemiplicata.*
r *Calymene senaria.*
r *Asaphus platycephalus.*

34. Thin bedded, fine grained limestone with many shaly layers. 5 ft. 315 ft. 6 in.

c *Dalmanella testudinaria.*
c *Plectambonites sericeus.*
r *Rafinisquina alternata.*
r *Parastrophia hemiplicata.*

35. Hard, fine grained, bluish layers interstratified with which are three beds of shale, each about six inches in thickness. 4 ft. 11 in. 220 ft. 5 in.

aa *Dalmanella testudinaria.*
c *Plectambonites sericeus.*
c *Rafinisquina alternata.*
c *Asaphus platycephalus.*
r *Calymene senaria.*
r *Ceraurus pleurexanthemus.*

36. Hard, gray, crystalline limestone. 4 ft. 5 in. 224 ft. 10 in.

r *Orthoceras* sp. und.
r *Bellerophon bilobatus.*
rr *Lingula* sp. und.
c *Dalmanella testudinaria.*
aa *Plectambonites sericeus.*
rr *Encrinurus vigilans.*
c *Asaphus platycephalus.*

37. Gray, very fossiliferous layers. 6 ft. 8 in. 231 ft. 6 in.

rr *Orthoceras* sp. und.
r *Bellerophon bilobatus.*
rr *Bucania punctifrons.*
a *Dalmanella testudinaria.*
r *Rafinisquina alternata.*
r *Dalmanites callicephalus.*
c *Plectambonites sericeus.*
r *Asaphus platycephalus.*
rr *Encrinurus vigilans.*
r *Calymene senaria.*

38. Character much the same as the preceding, but darker in color. 4 ft. 2 in. 235 ft. 8 in.

rr *Lingula curta.*
c *Plectambonites sericeus.*
rr *Dalmanella testudinaria.*
r *Monticulipora lycoperdon.*
a *Rafinisquina alternata.*
r *Asaphus platycephalus.*

39. Compact, dark gray, very fossiliferous limestone with little shale. 5 ft. 240 ft. 8 in.

rr *Raphistoma lenticulare.*
c *Bellerophon bilobatus.*
c *Bucania punctifrons.*
rr *Holopea paludiniformis.*
rr *Conularia trentonensis.*
c *Dalmanella testudinaria.*
c *Rafinisquina alternata.*
r *Parastrophia hemiplicata.*
rr *Encrinurus vigilans.*
rr *Monticulipora lycoperdon.*
c *Plectambonites sericeus.*
c *Ceraurus pleurexanthemus.*
c *Dalmanites callicephalus.*
r *Calymene senaria.*
r *Trinucleus concentricus.*
rr *Asaphus platycephalus.*

40. Fine grained, bluish limestone in thin beds, interstratified with shaly layers which are packed with brachiopods. 4 ft. 244 ft. 8 in.

rr *Cuneamya subtruncata.*
rr *Modiolopsis* sp. und.
rr *Pleurotomaria* sp. und.
aa *Dalmanella testudinaria.*
c *Plectambonites sericeus.*
c *Monticulipora lycoperdon.*
rr *Rafinisquina alternata.*
rr *Platystrophia biforata.*
r *Asaphus platycephalus.*
r *Trinucleus concentricus.*

41. Compact limestone with an occasional thin layer of shale. 6 ft. 6 in. 251 ft. 2 in.

c *Bellerophon bilobatus.*
aa *Dalmanella testudinaria.*
aa *Plectambonites sericeus.*
r *Calymene senaria.*
c *Asaphus platycephalus.*
rr *Trinucleus concentricus.*

42. Coarse grained limestone grading into a very fossiliferous shale at the top. 5 ft. 256 ft. 2 in.

rr *Bucania punctifrons.*
a *Dalmanella testudinaria.*
c *Plectambonites sericeus.*
c *Platystrophia biforata.*
c *Monticulipora lycoperdon.*
r *Asaphus platycephalus.*
r *Trinucleus concentricus.*
rr *Calymene senaria.*

43. Thin bedded limestone and a great many thick, shaly layers. 4 ft. 1 in. 260 ft. 3 in.

c *Dalmanella testudinaria.*
a *Plectambonites sericeus.*
c *Platystrophia biforata.*
r *Asaphus platycephalus.*
r *Dalmanites callicephalus.*
c *Trinucleus concentricus.*
c *Monticulipora lycoperdon.*

44. Mostly covered, one shaly layer only being exposed. 4 ft. 10 in. 265 ft. 1 in.

rr *Oncoceras constrictum.*
c *Dalmanella testudinaria.*
c *Rafinisquina alternata.*
r *Dalmanites callicephalus.*
a *Plectambonites sericeus.*
r *Asaphus platycephalus.*

45. Hard, compact gray limestone. 5 ft. 270 ft. 1 in.

rr *Trocholites ammonius.*
rr *Cyprocardites* sp. und.
r *Ctenodonta nasuta.*
r *Bellerophon bilobatus.*
r *Trematis terminalis.*
c *Dalmanella testudinaria.*
r *Rafinisquina alternata.*
r *Dalmanites callicephalus.*
c *Monticulipora lycoperdon.*
aa *Plectambonites sericeus.*
c *Platystrophia biforata.*
c *Asaphus platycephalus.*
r *Calymene senaria.*
rr *Pylloporina reticulata.*

46. Hard, coarse grained, crystalline limestone with shaly partings. 4 ft. 9 in. 274 ft. 10 in.

c *Orthoceras* sp. und.
r *Bellerophon bilobatus.*
r *Lingula rectilateralis.*
a *Rafinisquina alternata.*
a *Plectambonites sericeus.*
aa *Platystrophia biforata.*
r *Ceraurus pleurexanthemus.*
r *Trinucleus concentricus.*
c *Calymene senaria.*
r *Dalmanites callicephalus.*
c *Asaphus platycephalus.*

47. Very like 46, but in thinner beds. 3 ft. 277 ft. 10 in.

r *Orthoceras* sp. und.
rr *Cyrtolites trentonensis.*
c *Bellerophon bilobatus.*
r *Lingula rectilateralis.*
c *Rafinisquina alternata.*
r *Plectambonites sericeus.*
r *Dalmanites callicephalus.*
c *Platystrophia biforata.*
aa *Asaphus platycephalus.*
r *Calymene senaria.*
c *Trinucleus concentricus.*

CORRELATION AND CONCLUSIONS

From the measurements it will be seen that B 6, 7, 8, 9 correspond to C 9 and 10. B 14, 15, 16 are the same layers as C 12 and the lower 7 feet of C 13. The gap at B 5 is filled by C 3 to 8; and B 10 to 13 exhibits the strata covered by the rubbish east of the fort (C 11). All of section A is below the base of C.

The Chazy in this section is not capable of the same subdivisions as at Valcour Island and elsewhere to the northward. At the base there is a well-marked zone of shale and hard magnesian limestone, 25 feet in thickness, containing *Lingula brainerdi* and fucoids in abundance. This zone is also well shown at Valcour Island, where it is 26 feet thick with the base not shown. There, in addition to the numerous *Lingulæ*, it contains other fossils.

Above this zone, the measures consist of more or less impure limestones, usually thin bedded and often shaly. *Maclurea magna*, *Rafinisquina champlainensis*, *Dinorthis deflecta* (?), *Camarella varians* and *Asaphus canalis* are found almost everywhere in these strata except for a few feet near the top. *Camarotœchia plena* Hall, which is so abundant in the upper part of the more northern sections, is not found here. *Raphistoma planistria* var. *parvum* Hall, which, by its abundance, characterizes a zone in the upper part of the mass at Crown Point, is also abundant in a zone about 90 feet below the top at Valcour Island. However, the accompanying fauna is quite different. The species provisionally identified as *Dinorthis deflecta* Conrad occurs abundantly in many localities, but is almost always partially exfoliated or in casts. More perfectly preserved specimens are needed to make sure its specific identification.

As would be expected from the nature of the sediments, pelecypods are almost entirely wanting.

The Birdseye limestone in this section is a lighter colored, purer subdivision of the Black River, grading gradually into it. The latter can here be subdivided into faunal zones, which might be named from the class of fossils which is most abundant in them. At the base is the Birdseye zone, 5 feet in thickness, characterized by *Phytopsis tubulosus* Hall and *Leperditia fabulites* Conrad. Above it, the Pelecypod zone, 7 feet in thickness, contains an abundance of lamellibranchs of the genera *Ctenodonta*, *Cuneamya* and *Whitella*. The remainder can be put into one zone, 55 feet in thickness, in which both the brachiopoda and crustacea are common, the latter being more prominent in the lower 30 feet and the brachiopoda in the upper part.

There seems to be a direct connection between the lithological characters of these zones and the fossil contents. The first is a very pure, light colored, fine grained limestone; the second, pure, lumpy, black and heavy bedded; the third, impure, coarse, light gray and rather crystalline in the lower part, becoming finer grained, but still impure, toward the top.

The fossils which at this locality occur commonly in the Black River, and in none of the other formations, are: *Maclurea logani* Salter, *Plectorthis plicatella* Hall, *Strophomena incurvata* Shepard, *Zygospira recurvirostris* Hall, *Stromatocerium rogosum* Hall, *Columnaria alveolata* Goldfuss, and *Leperditia fabulites* Conrad. The abundance of *Rhynchotrema inæquivalve* Castelnau, *Ceraurus pleurexanthemus* Green, and *Dalmanites callicephalus* Hall is a feature of these limestones at many localities and is well illustrated in this section. Only the branching form of *Monticulipora lycoperdon* Say occurs below the Trenton, thus agreeing with the statement of E. R. Cummings* regarding the same fossil in the Mohawk valley. He found the hemispheric form above the Black River only.

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*Lower Silurian Sections. Bull. N. Y. State Museum, No. 34. Albany, 1900.

The lowest member of the Trenton in this section is the *Raphistoma lenticulare* zone, 4 feet 9 inches in thickness. This fossil is common in this zone, but only one specimen was found above.*

Above this is the *Parastrophia hemiplicata* zone of Theo. G. White†. Although not abundant, this fossil is characteristic of 20 feet 9 inches (C 31–34). C 39–43 are marked by the presence of *Trinucleus concentricus* Eaton, which is not found lower in the strata. It will be seen that trilobites are a much more prominent part of the fauna after C 37. *Asaphus platycephalus* Stokes, which has not before been common, becomes abundant in C 46 and 47.

Dalmanella testudinaria, *Rafinisquina alternata*, *Plectambonites sericeus*, *Bellerophon bilobatus*, *Asaphus platycephalus*, and *Calymene senaria* are found all through the Trenton here, as at the type locality, Trenton Falls, N. Y. *Platystrophia biforata* is not found in the lowest part, either in this section or at Trenton Falls. Lamellibranchs are not common at either place.

LIST OF SPECIES

A 1–8.	Basal 52 feet of Chazy.
B 1–16.	Upper 146 feet of Chazy.
C 1–17.	Upper 219 feet of Chazy.
C 18–29.	Black River. 67 feet.
C 30–47.	Trenton limestone. Lower 88 feet.

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*Since the Trenton at Crane's Point and Norton's Bay on the Vermont side of the lake, about two miles distant, is 314 feet in thickness, the strata shown on this Point represent less than one-third of a complete section.

†Trans. N. Y. Acad. Sci., XXV, p. 20 (1895).

PLANTÆ (?)

Phytopsis tubulosus Hall. C 18.

CŒLENTERATA.

Monticulipora lycoperdon Say.
  Ramose form. C 6, 19, 20, 23, 24, 26, 27.
  Both ramose and hemispheric forms. C 32, 38, 39, 40, 43.
Streptolasma expansum Hall. B 4, 9. C 7.
S. corniculum Hall. C 19, 20, 23.
Columnaria alveolata Goldfuss. C 20, 21, 23, 27.
Stromatocerium rogosum Hall. C 21, 23, 24, 25, 27.

ECHINODERMATA.

Palæocistites tenuiradiatus Hall. C 6, 12.

MOLLUSCOIDEA.

1. Bryazoa.

Stictopora elegantula Hall. C 10 (?), 20, 24.
Pylloporina reticulata Hall. C 45.

2. Brachiopoda.

Lingula brainerdi n. sp. A 2.
L. curta Conrad. C 38.
L. rectilateralis Emmons. C 46, 47.
Glossina trentonensis Conrad. C 27.
Trematis terminalis Emmons. C 45.
Rafinisquina alternata Emmons. A 6. B 4, 10, 13, 16. C 6, 10, 19, 20, 23, 24, 27, 32–35, 38–40, 44–47.
R. fasciata Hall. A 6. B 3, 4, 10. C 3.
R. champlainensis n. sp. A 8. B 4, 8, 10, 11. C 3, 6.
Strophomena incurvata Shepard. C 19, 21, 23–28.
Plectambonites sericeus Sowerby. C 31, 36, 38–47.
Triplecia gracilis n. sp. A 8. B 7, 11, 13, 15. C 12.
T. extans Emmons. C 27, 30.
Orthis costalis Hall. A 6.
O. hippolyte Billings. C 1.

O. (?) porcia Billings. A 7, 8. C 1.
O. tricenaria Conrad. C 33.
Plectorthis plicatella Hall. C 19, 20, 23, 24.
Dinorthis deflecta (?) Conrad. A 8. B 3, 4, 8–11. C 3, 4, 6, 7, 10, 12, 16.
D. pectinella Emmons. C 24, 27.
D. platys Billings. A 5, 6, 7.
Hebertella borealis Billings. A 6, 8.
Platystrophia biforata Schlotheim. C 40, 42, 43, 45–47.
Dalmanella (?) plicifera Hall. B 8, 11, 15. C 10, 12.
D. subæquata pervetus Conrad. C 20.
D. testudinaria Dalman. B 15. C 24, 28, 32–47.
Camarella longirostris Billings. B 9, 10, 13, 15. C 3, 4, 10, 12.
C. varians Billings. A 5, 7. B 5, 10, 12, 13, 15, 17. C 1, 7, 10, 12, 16.
Parastrophia hemiplicata Hall. C 31, 33, 34, 39.
Rhynchotrema inæquivalve Castelnau. C 20, 23, 24.
Rhynchonella (?) acutirostris Hall. C 1.
Zygospira recurvirostris Hall. B 18, 20, 21, 24, 25.

MOLLUSCA.

1. Pelecypoda.

Ctenodonta levata Hall. B 3, 9. C 6, 19, 25–27, 30, 32.
C. nasuta Hall. B 13. C 19, 20, 25, 45.
Whitella ventricosa Hall. C 19, 32.
Cuneamya subtruncata Hall. C 19, 23.
Ambonychia mytiloides Hall. C 10.

2. Gastropoda.

Raphistoma lenticulare Emmons. C 25, 30, 39.
R. planistria var. parvum Hall. B 3, 10. C 7, 12.
R. stamineum Hall. B 3, 4. C 12, 16.
R. striatum Emmons. B 4, 9. C 6, 7.
Holopea paludiniformis Hall. C 39.
Ecculiomphalus fredericus n. sp. B 7. C 3, 6, 7.

Metoptoma dubia Hall. B 13. C 10.
M. montrealensis Billings. C 10, 12.
Subulites elongatus Emmons. C 30.
Maclurea magna Le Sueur. A 6, 7. B 3, 6–11. C 1, 3, 4, 6, 7, 12, 13.
M. logani Salter. C 19, 27, 28.
Murchisonia gracilis Hall. C 19, 23.
M. milleri Hall. C 19, 20, 23–26.
M. perangulata Hall. B 10. C 6.
Fusispira subfusiformis Hall. C 20.
Pleurotomaria subconica Hall. C 19.
Bellerophon bilobatus Sowerby. C 30, 32, 36, 37, 39, 41, 45–47.
Bucania champlainensis Whitfield. B 4, 9.
B. punctifrons Emmons. C 37, 39, 42.
B. sulcatina Emmons. B 4.
Cyrtolites trentonensis Conrad. C 6 (?), 47.

3. Pteropoda.

Conularia trentonensis Hall. C 38.
Pterotheca expansa Emmons. C 40.

4. Cephalopoda.

Orthoceras tenuiseptum Hall. C 7.
Endoceras protiforme Hall. C 30, 31.
Oncoceras constrictum Hall. C 47.
Lituites undatus Emmons. C 12 (?).
Trocholites ammonius Conrad. C 45.

CRUSTACEA.

1. Trilobita.

Trinucleus concentricus Eaton. C 39–43, 47.
Asaphus canalis (Conrad) Whitfield. A 6–8. B 3, 4, 6, 8–11, 13, 15, 16. C 1, 3, 4, 6, 7, 10, 12, 16.
A. marginalis Hall. C 10, 12.
A. obtusus Hall. B 13, 15. C 12.

A. platycephalus Stokes. B 15. C 19–21, 23–25, 27, 28, 30, 33, 35–47.

Illænus americanus Billings. C 20, 26.

I. arcturus Hall. B 4, 7. C 6, 20, 23, 24.

I. ovatus Conrad. B 9–11, 15. C 4, 6, 7, 32.

Encrinurus vigilans Hall. C 36, 37, 39.

Bathyurellus validus Billings. B 13.

Bathyurus spiniger Hall. C 20, 24.

Calymene senaria Conrad. C 31–33, 35, 37, 39, 41, 42, 45–47.

Ceraurus pleurexanthemus Green. C 19, 24, 31, 35, 39, 46.

Dalmanites eboraceus Clarke. C 23, 24.

D. callicephalus Hall. C 23, 24, 37, 39, 43–47.

2. Ostracoda.

Leperditia amygdalina Jones. B 3, 4, 8. C 1, 3, 4.

L. canadensis var. nana Jones. A 7. B 6, 8–11, 15. C 1, 5, 6, 10, 12, 19–21, 24, 27.

L. fabulites Conrad. C 18–21, 23, 24.

Primita logani Jones. B 8, 15. C 19.

DESCRIPTION OF FOSSILS*

LINGULA Bruguière

Lingula brainerdi sp. nov., Pl. 18, figs. 2, 3

Shell subrectangular, expanding only slightly toward the front; beak small; apical angle very obtuse; posterior regularly rounded; front nearly straight, with gently curved angles. Greatest convexity about middle of valves; the anterior slope flattened. Surface marked by closely arranged fine lamellose lines of growth and partially exfoliated specimens show numerous fine radiating lines which are more common and strong near the middle of the valves.

The figures do not show the characters well owing to the poor specimens from which they were drawn. Better material has been obtained since from Valcour Island and will be figured at a later date.

Locality.—A 2. Crown Point, N. Y. Base of the Chazy, Valcour Island and Isle LaMotte.

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*All the fossils here described and figured are in the Museum of Paleontology of Cornell University.

RAFINISQUINA Hall and Clarke

Rafinisquina champlainensis sp. nov., Pl. 18, figs. 5, 6

Shell large, ventricose, almost hemisperical in some specimens. Length is to width as 6:7. Hinge line longer than the greatest width below; cardinal extremities often produced into short, broad, rounded ears; beaks small; ventral valve very convex, greatest convexity being about the middle of the valve; dorsal valve concave, but does not follow exactly the curvature of the ventral, the umbo being flattened.

Surface marked by numerous fine radiating striæ, about every third or fourth one being stronger than the ones between. The striæ increase toward the front by implantation. In the partially exfoliated state in which the specimens are usually found, the striæ appear nearly equal and the shell rather fibrous.

Locality.—In the middle portion of the Chazy at Crown Point, Valcour Island, Maclurea Point, and elsewhere along Lake Champlain.

STROPHOMENA Rafinesque (de Blainville)

Strophomena incurvata Shepard, Pl. 19, fig. 11

This well-marked fossil is rather common all through the Black River limestone in this section, but does not cross the line into the Trenton. It is reported as common in the Trenton of Minnesota, but in eastern and northern New York it is common only in the Black River and may be considered a characteristic fossil.

Locality.—Black River limestone. Crown Point, N. Y.

TRIPLECIA Hall

Triplecia gracilis sp. nov., Pl. 18, fig. 1

Shell small, nearly circular in outline, both valves moderately convex; greatest convexity about the middle of the valves; beaks small, that of the dorsal valve hardly extending beyond the hinge line; cardinal line short. The dorsal valve has a small rounded fold extending from the front about one-third the length of the shell. The sinus of the ventral valve is shallow, equal in length to the fold.

Shell thin, the surface marked by fine concentric striæ which undulate in crossing the fold and sinus. The surface of the cast is marked by very numerous fine, wavy, radiating lines.

This small species differs from *Triplecia nucleus* Hall in the presence of radiating markings, less convexity of valves, and in the shape and extent of the fold and sinus. It differs from the young of *Triplecia extans* Emmons in the shape and extent of the fold and sinus and in the length of the cardinal line.

Locality.—Found in zones A 8, B 7, 11, 13, 15, and C 12 of the Chazy limestone, Crown Point, N. Y. Also at Valcour Island, N. Y.

Triplecia extans Emmons, Pl. 19, fig. 4

This figure is introduced for comparison with *Triplecia gracilis* of the Chazy. It was drawn from a rather large specimen collected in zone C 27 of the Black River limestone.

PLECTORTHIS Hall and Clarke

Plectorthis plicatella Hall, Pl. 19, figs. 5, 6

Hall's description: "Broadly semioval, nearly æquivalve, length and breadth about 3 to 4. Surface marked by strong, radiating plicæ, which are usually simple, about 20 to 28 on each valve, crossed by simple elevated concentric lines, which are more distinct in the depressions between the costæ, and often obscure or obsolete upon their exposed surfaces; valves nearly equally convex without sensible depression or elevation on either one, meeting at the edges in a straight line; cardinal line not extending beyond the width of the shell; area narrow; dorsal foramen extending to the beak."

In the cast of the pedicle valve the muscular scars are subelliptical and small, but strongly impressed.

Locality.—Rather common in zones C 19, 20, 23, 24 of the Black River limestone, Crown Point, N. Y.

ECCULIOMPHALUS Portlock

Ecculiomphalus fredericus sp. nov., Pl. 18, fig. 4

Very loosely coiled, making but one volution; tapering rather abruptly at the apex; test thin, marked by distant lamellose lines of growth; cast rounded, smooth; section nearly circular.

Diameter of largest specimen, 3.5 cm. Greatest diameter of outer coil, 1 cm.

Locality.—Found rarely in zones B 7 and C 3, 6, 7. Chazy limestone, Crown Point, N. Y.

BUCANIA Hall

Bucania champlainensis Whitfield, Pl. 18, figs. 7, 8

Whitfield's description: "Shell of medium size for the genus, with the outer volution broadly expanded and much thickened, being somewhat heart-shaped on the margin of the lip. Inner volutions rounded and involved within the lip of the outer one to the extent of nearly or quite one-third of its diameter, but showing deep umbilical cavities on the sides. Number of volutions three or four."

Our specimens show a broad, fairly deep notch in the lip. The surface is marked by numerous lamellose lines of growth which bend backward at the notch, following the contour of the lip.

Locality.—Common in B 4 and C 9. Chazy limestone, Crown Point, N. Y.

MACLUREA Le Sueur

Maclurea magna Le Sueur, Pl. 18, fig. 10

This characteristic fossil of the Chazy is found at Crown Point at the top of section A, all through section B, and in section C up to zone 14, about 50 feet below the base of the Black River limestone. The specimens occur principally as casts, but many can be obtained which show the surface markings.

RAPHISTOMA Hall

Raphistoma lenticulare Emmons, Pl. 19, figs. 7, 8

Shell discoidal, spire depressed, flattened; volutions about four, body whorl wider than all the others. Suture deep in cast. Umbilicus about one-third the width of under surface, extending to top. Aperature subtrigonal, transversely extended; outer edge obtuse.

None of the specimens from this locality have the surface markings preserved.

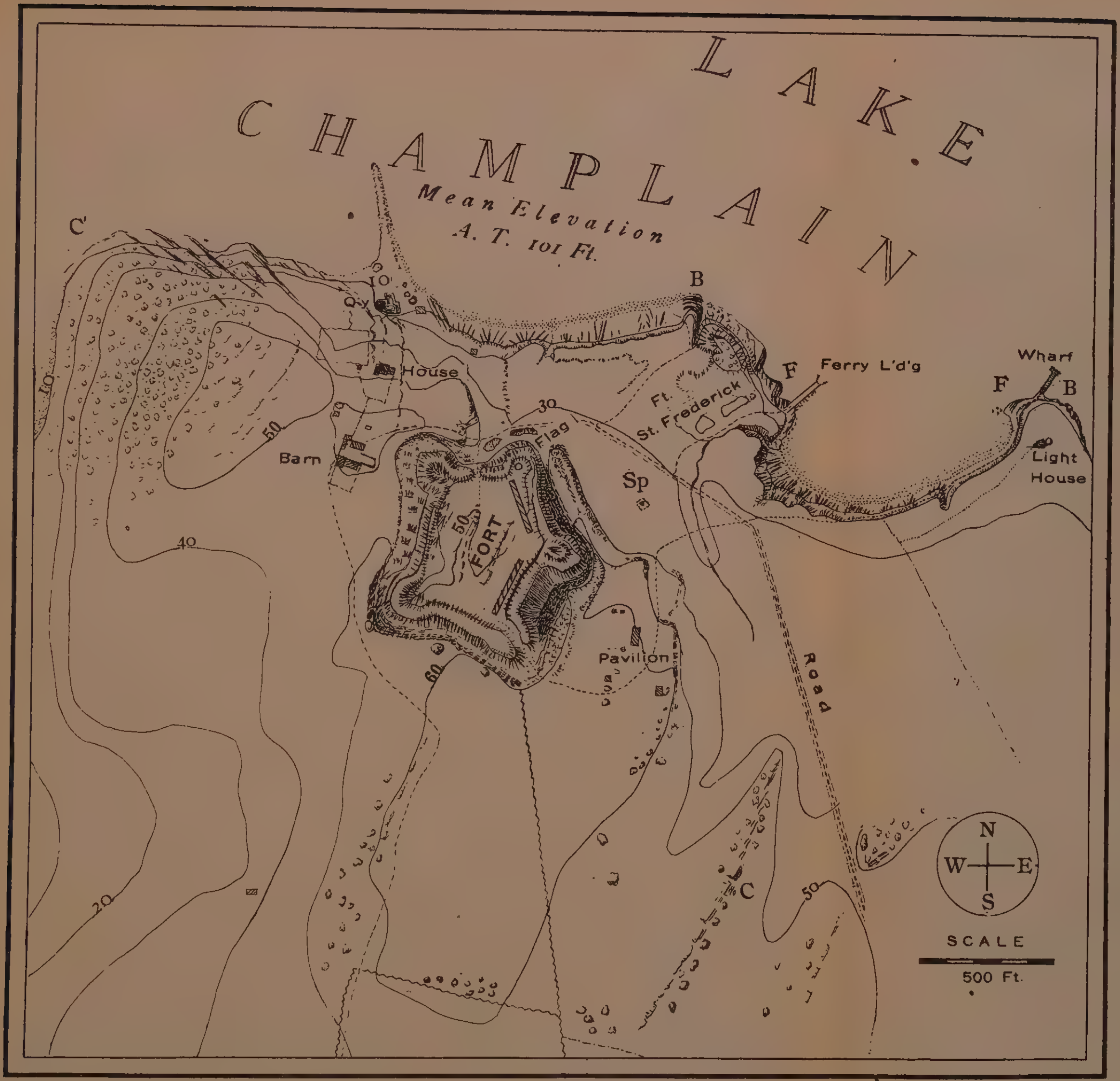
Locality.—Top of the Black River and base of the Trenton. C 25, 30, 39. Crown Point, N. Y.

PTEROTHECA Salter.

Pterotheca expansa Emmons, Pl. 19, fig. 12

This obscure fossil is figured here in hope that the attention of other workers will be called to it. Its affinities seem to be rather doubtfully understood.

Locality.—Lower Trenton, Crown Point, N. Y.



Topographic Map of Northern End of Crown Point, Showing Location of Sections B and C. F, F Denotes Good Collecting.

[This Map was practically ruined by the Engraving Co. and we regret not having time to redraw it.—Ed.]

Plate 18

CHAZY FOSSILS

EXPLANATION OF PLATE 18

Page.

Fig. 1. *Triplecia gracilis* n. sp. A brachial valve........37, **303**

2. *Lingula brainerdi* n. sp. A partially exfoliated specimen showing radiating lines............36, **302**

3. A fragment of another specimen showing the surface markings.

4. *Ecculiomphalus fredericus* n. sp. A specimen preserving a part of the shell..................39, **305**

5. *Rafinisquina champlainensis* n. sp. A pedicle valve..37, **303**

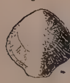
6. A side view of the same showing the great convexity.

7. *Bucania champlainensis* Whitfield. Looking down upon a somewhat crushed specimen, showing the outline of the lip..........39, **305**

8. Another view of the same specimen, showing the notch in the lip and the surface markings.

9. *Illænus ovatus* Conrad. The figure is that of a specimen from which the eyes and spines have been broken.

10. *Maclurea magna* Le Sueur. A small specimen preserving the surface markings and showing the gradual expanding of the volutions..39, **305**



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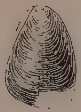

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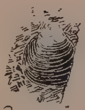

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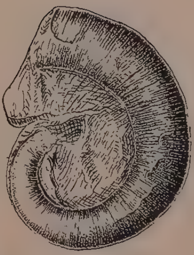

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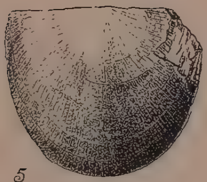

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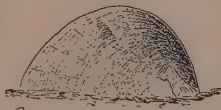

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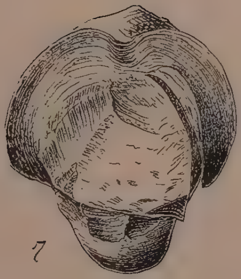

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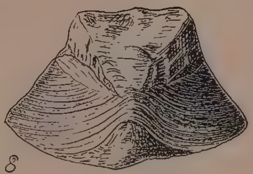

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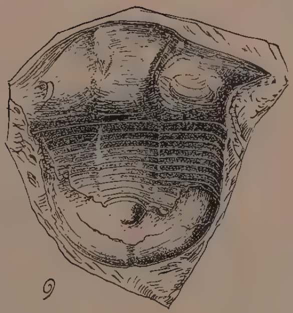

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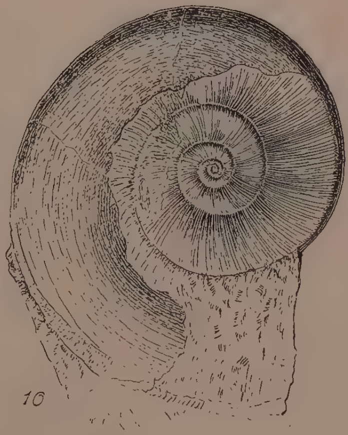

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Plate 19

BLACK RIVER AND TRENTON FOSSILS

EXPLANATION OF PLATE 19

Page.

Fig. 1. *Bathyurus spiniger* Hall. A glabella showing tubercles and the faint lateral grooves. Black River.

2. Pygidium of the same, showing the base of the spine and the tubercles on the end of the axis.

3. Side view of the same.

4. *Triplecia extans* Emmons. Dorsal valve of a large individual. Black River...............38, **304**

5. *Plectorthis plicatella* Hall. Cast of the ventral valve, showing muscular scar. Black River...38, **304**

6. Cardinal areas of the same, showing pedicle opening.

7. *Raphistoma lenticulare* Emmons. Side view of cast. Trenton limestone.......................40, **306**

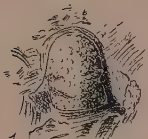
8. Top view of the same.

9. *Bucania punctifrons* Emmons. Side view of a medium sized specimen. Trenton.

10. Another view showing surface markings and carina.

11. *Strophomena incurvata* Shepard. Interior of a ventral valve. Black River....................37, **303**

12. *Pterotheca expansa* Emmons. Trenton...........40, **306**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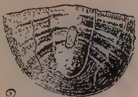
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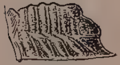
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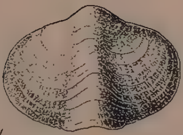
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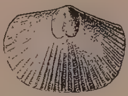
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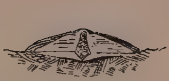
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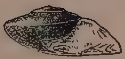
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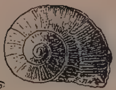
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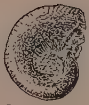
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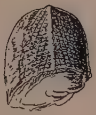
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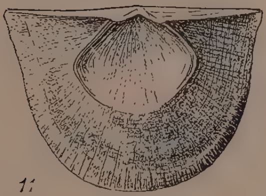
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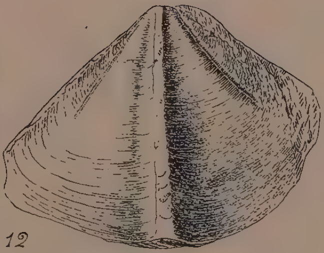
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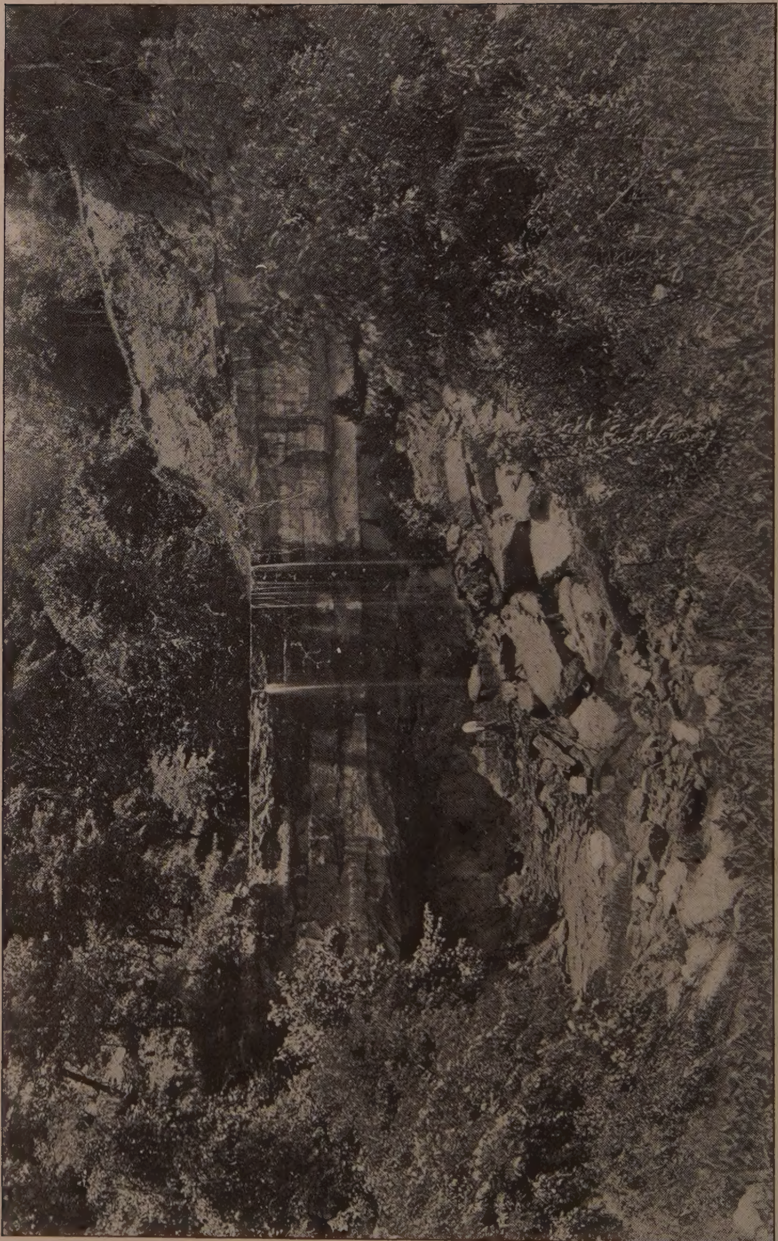

FALLS OF MINT SPRING BAYOU, VICKSBURG (see page 72).